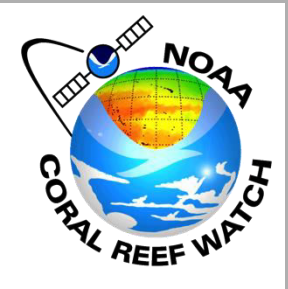


2016 Outlook on Coral Bleaching: El Niño, the guest overstaying his welcome

Dr. C. Mark Eakin
NOAA Coral Reef Watch
<http://coralreefwatch.noaa.gov>

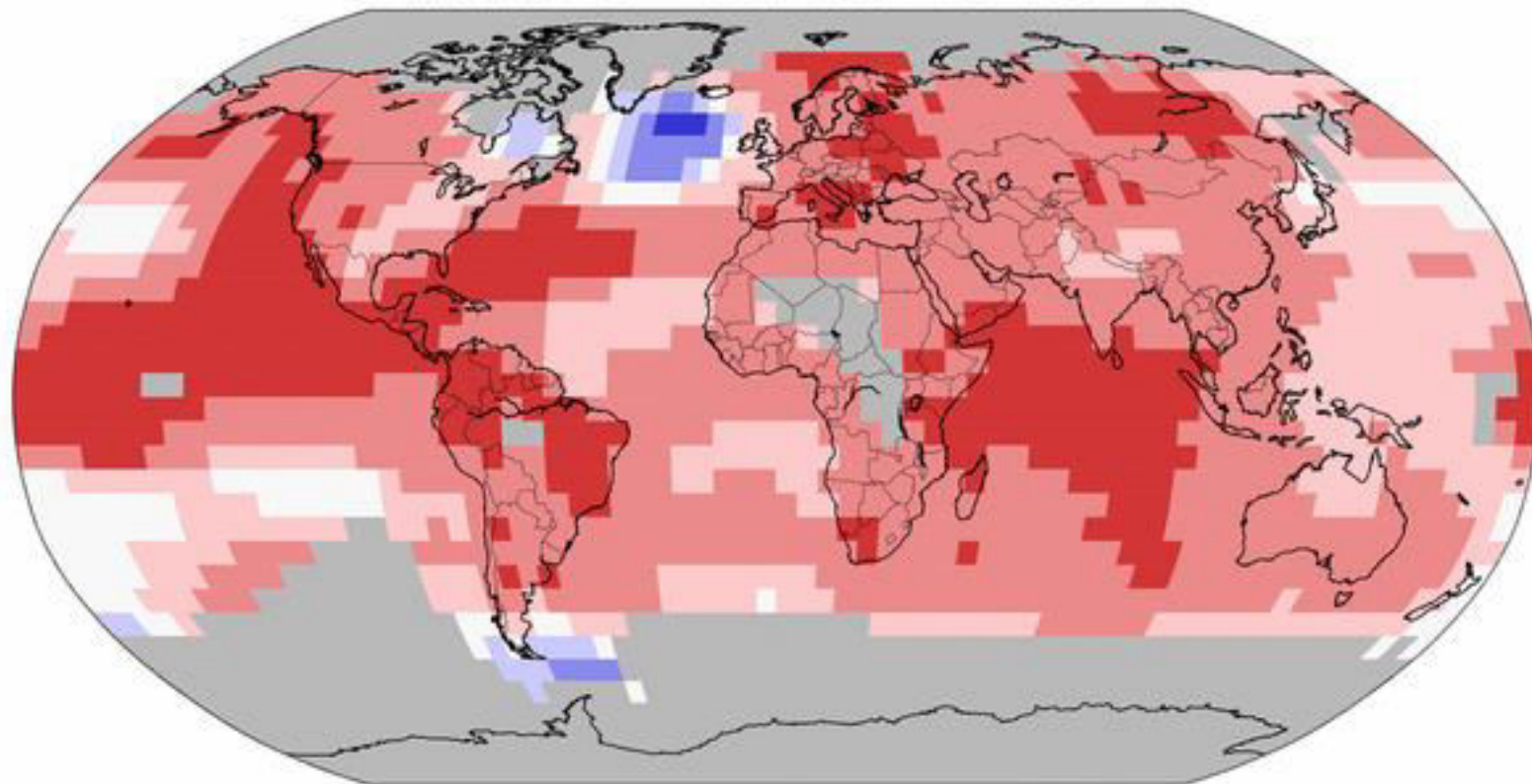


2015: Warmest Year Ever – Again

Land & Ocean Temperature Percentiles Jan–Dec 2015

NOAA's National Centers for Environmental Information


Data Source: GHCN–M version 3.3.0 & ERSST version 4.0.0




Record
Coldest


Much
Cooler than
Average


Cooler than
Average


Near
Average


Warmer than
Average


Much
Warmer than
Average

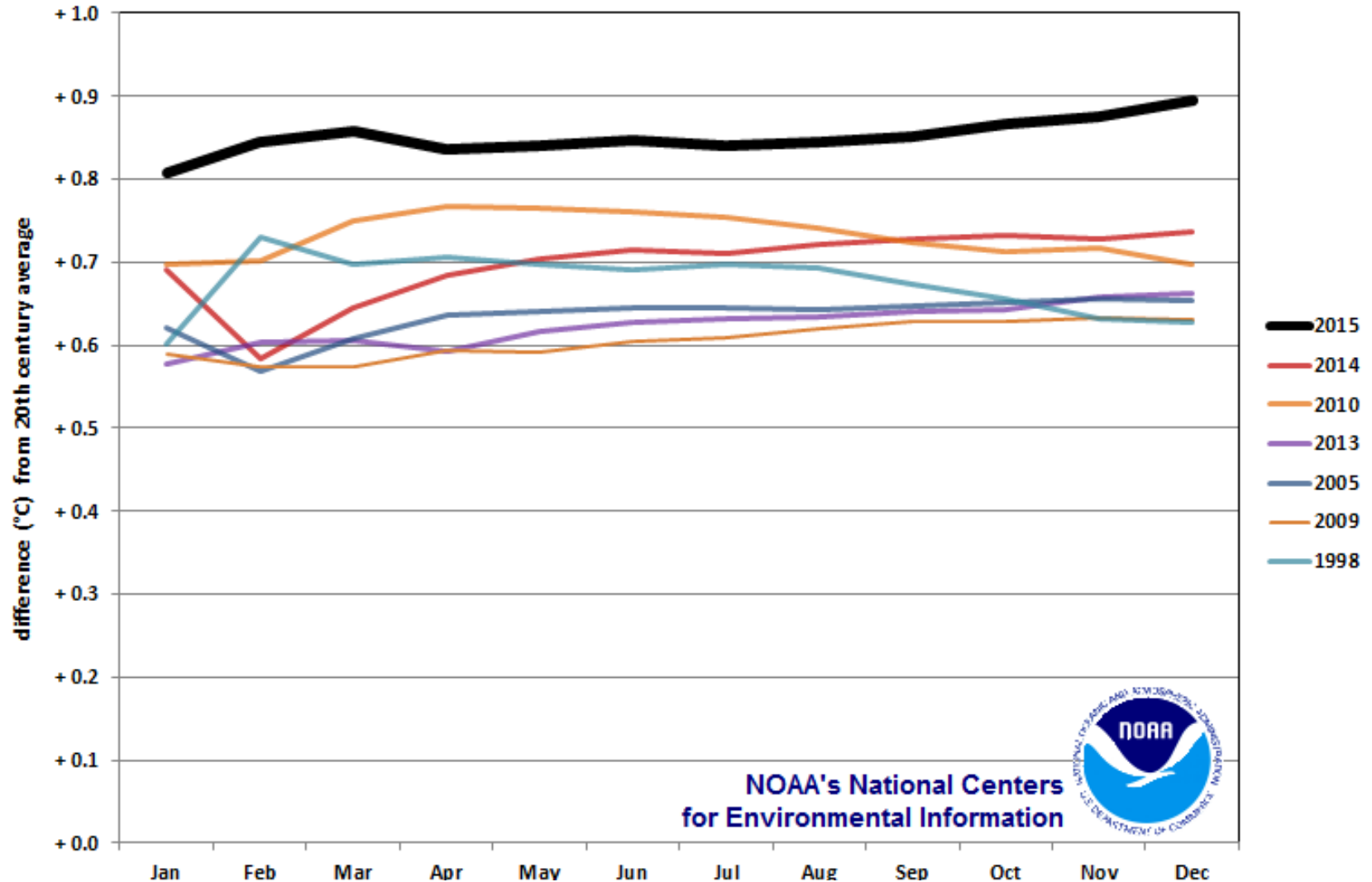

Record
Warmest



Wed Jan 13 12:15:02 EST 2016

2015: Warmest Year Ever – Again

Year-to-Date Global Temperature
for 2015 and the other six warmest years on record



NOAA's National Centers
for Environmental Information



2015 Hawai'i Bleaching

XL CATLIN
SEAVIEW™
SURVEY

Kahului Point, Maui, Hawaii - 28th August 2015

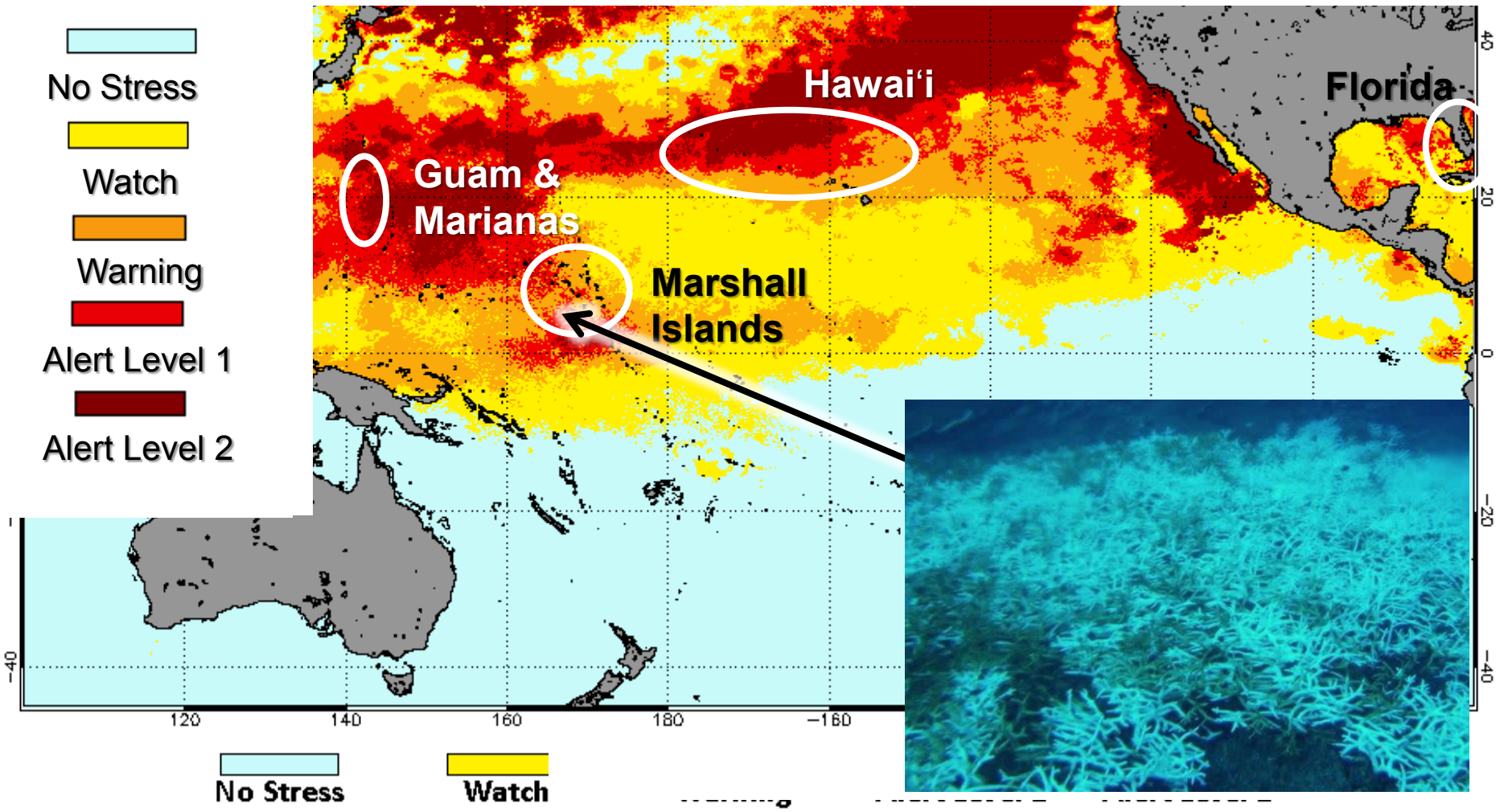


Kahului Point, Maui, Hawaii - 6th November 2015



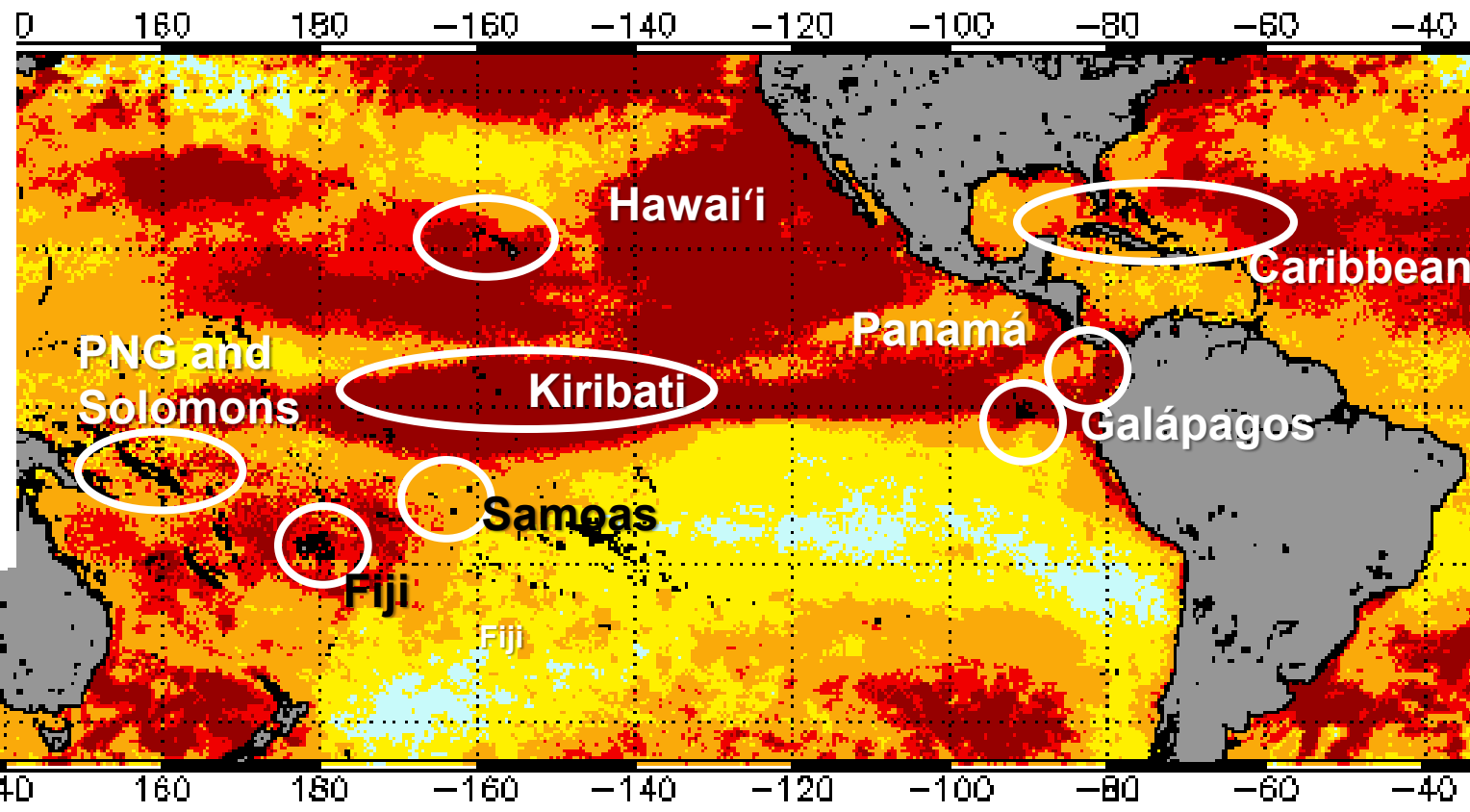
Global Bleaching: Last Half of 2014

NOAA Coral Reef Watch Annual Maximum Satellite Coral Bleaching Alert Area 2014

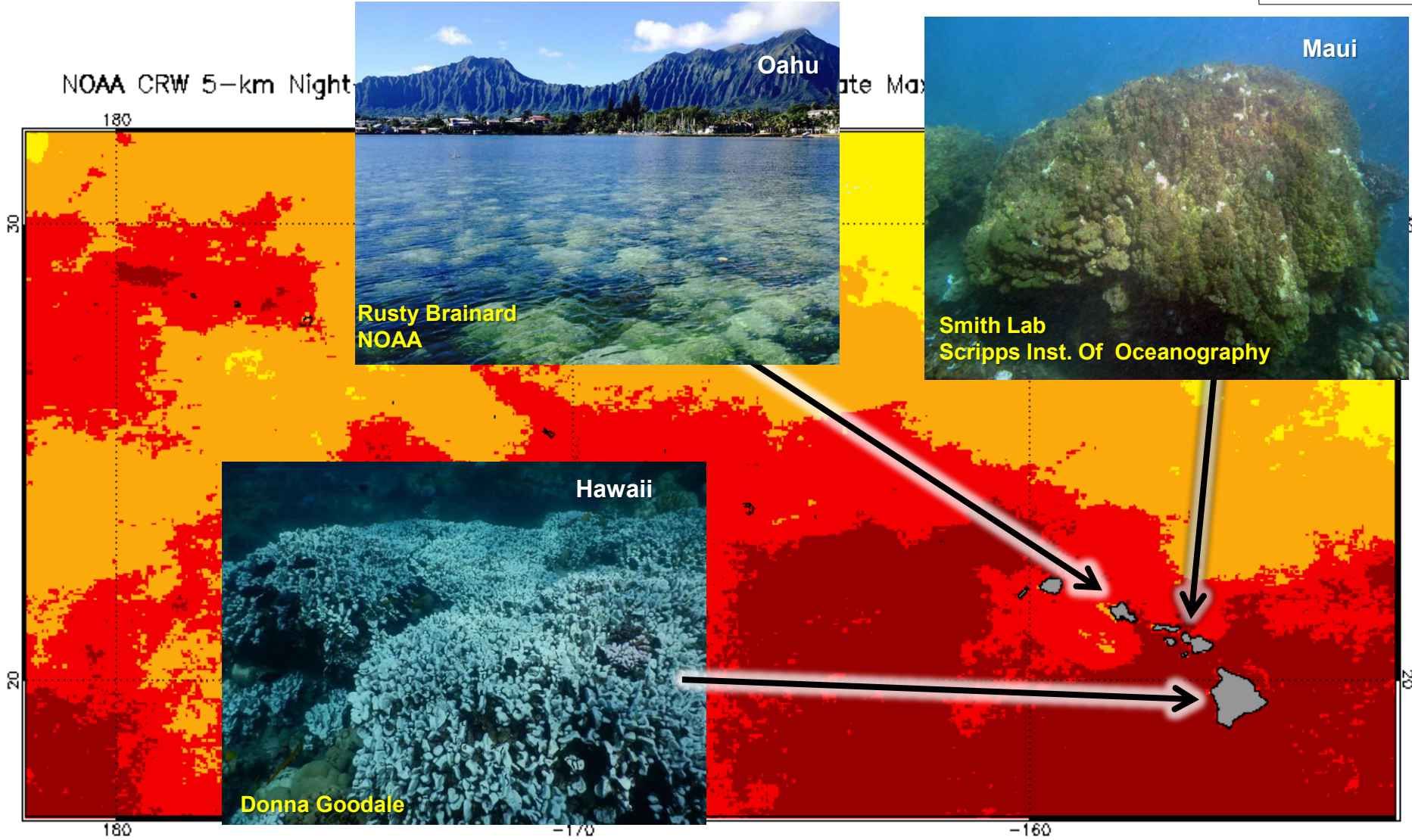


Global Bleaching: 2015

NOAA Coral Reef Watch Annual Maximum Satellite Coral Bleaching Alert Area 2015

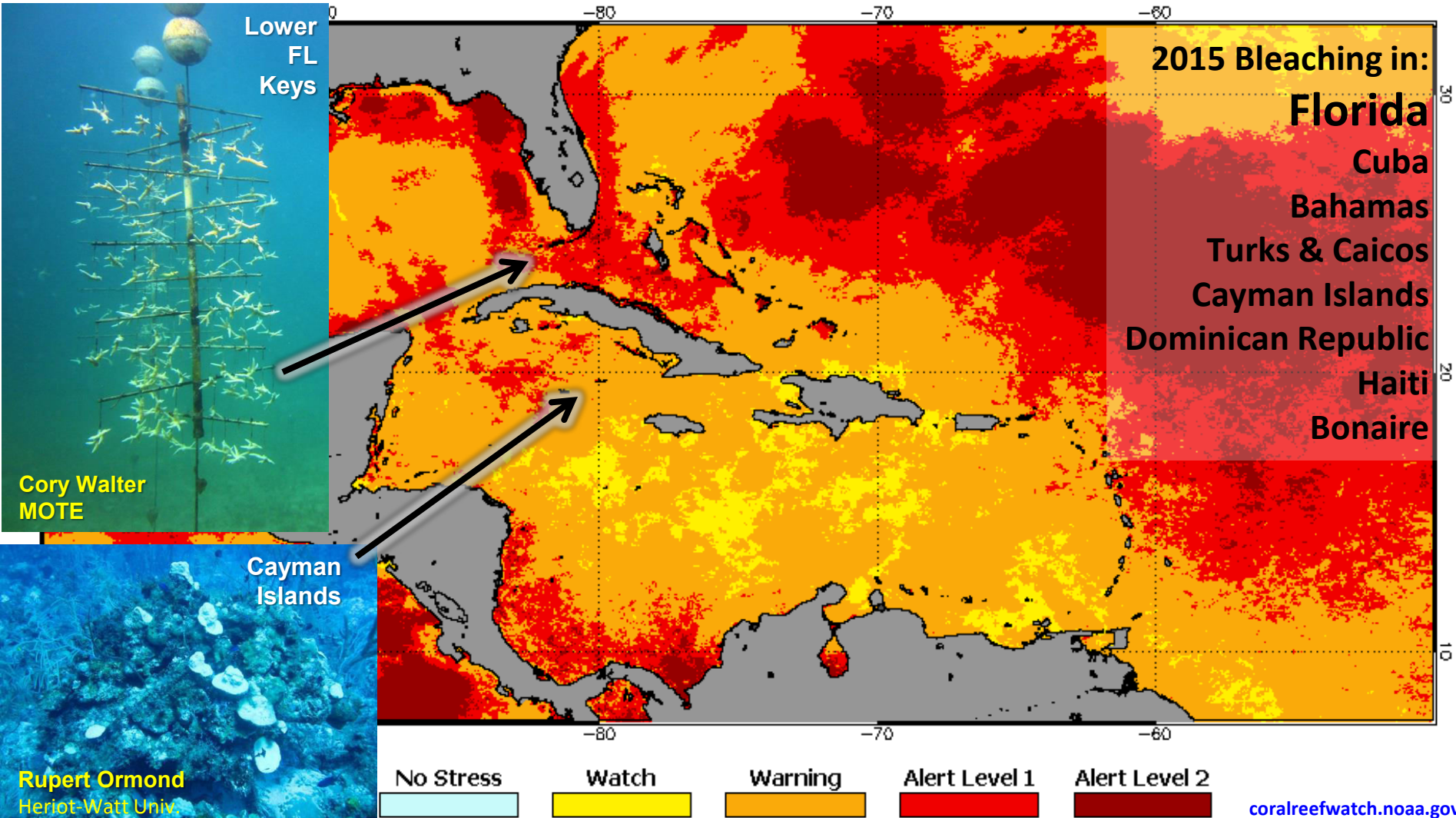


2015 Hawai'i Bleaching



2015 Caribbean Bleaching

NOAA CRW 5-km Night-Only Bleaching Alert Area Year-to-date Maximum 27 Nov 2015



June 2014-December 2015 Thermal Stress

Global Reefs:

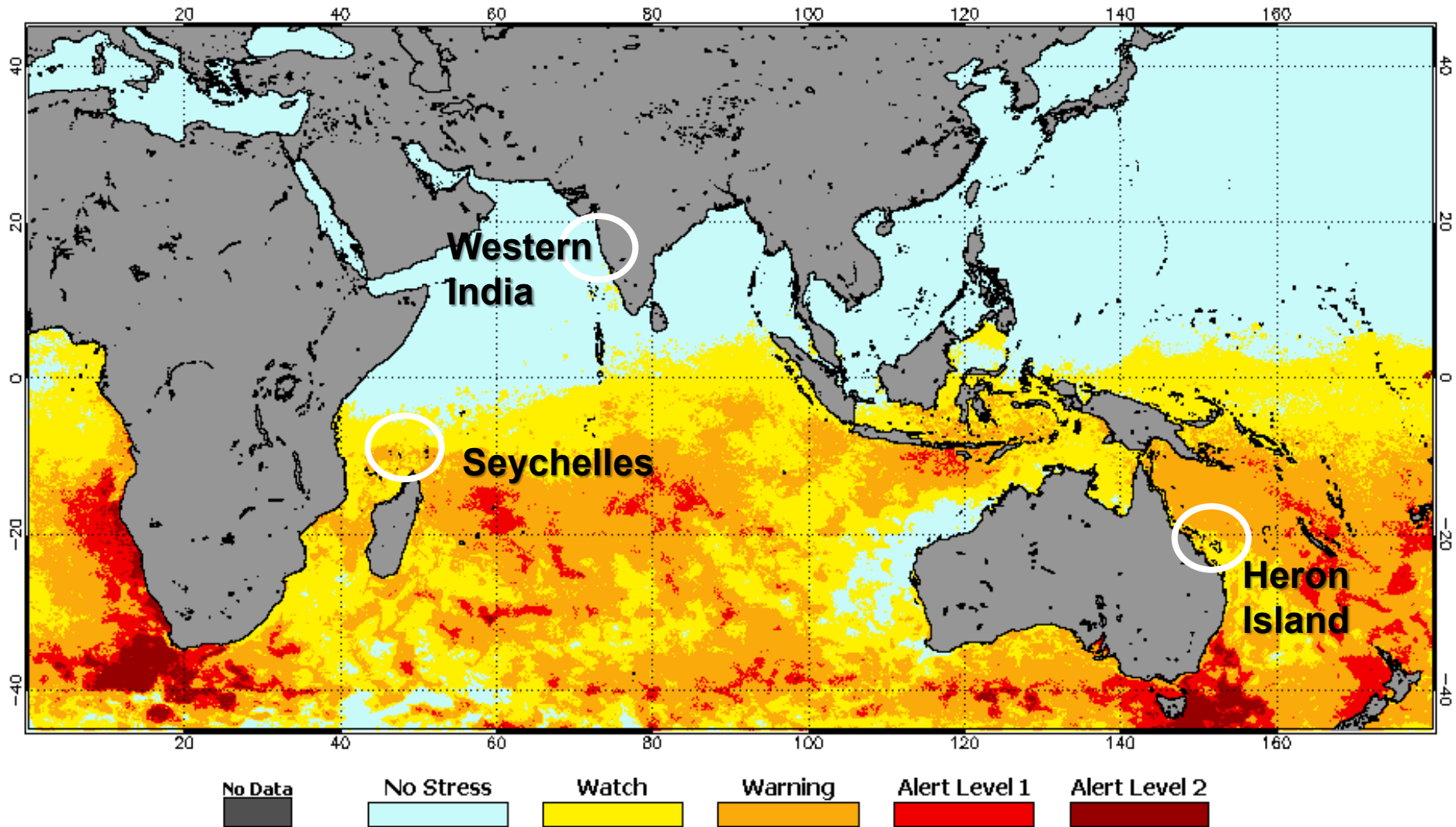
- **32% exposed to Alert Level 1 or 2**
- **~100% stressed**

US Reefs:

- **72% exposed to Alert Level 1 or 2**
- **100% stressed**

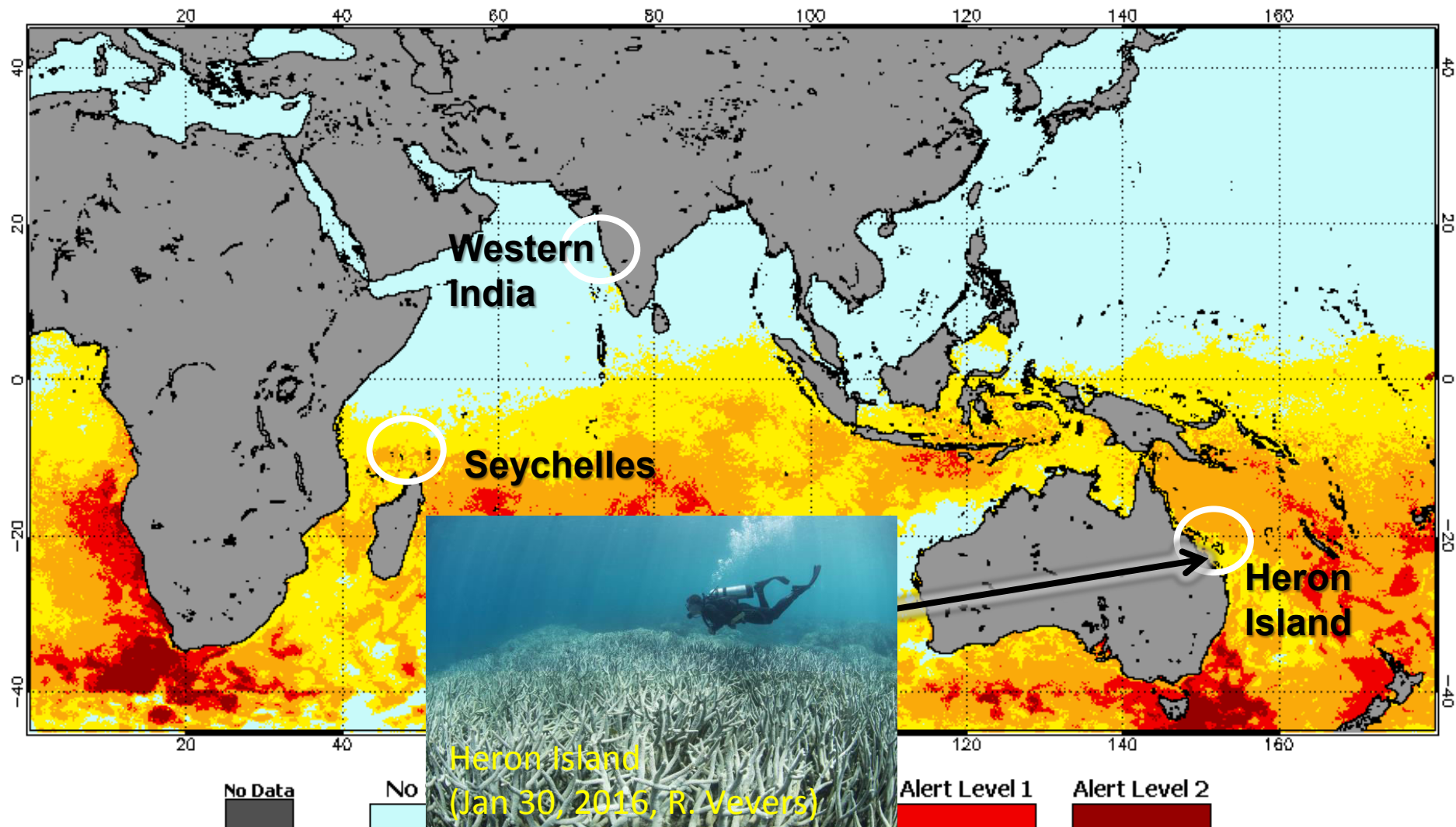
Global Bleaching: Early 2016

NOAA CRW 5-km Night-Only Bleaching Alert Area Year-to-date Maximum 15 Feb 2016



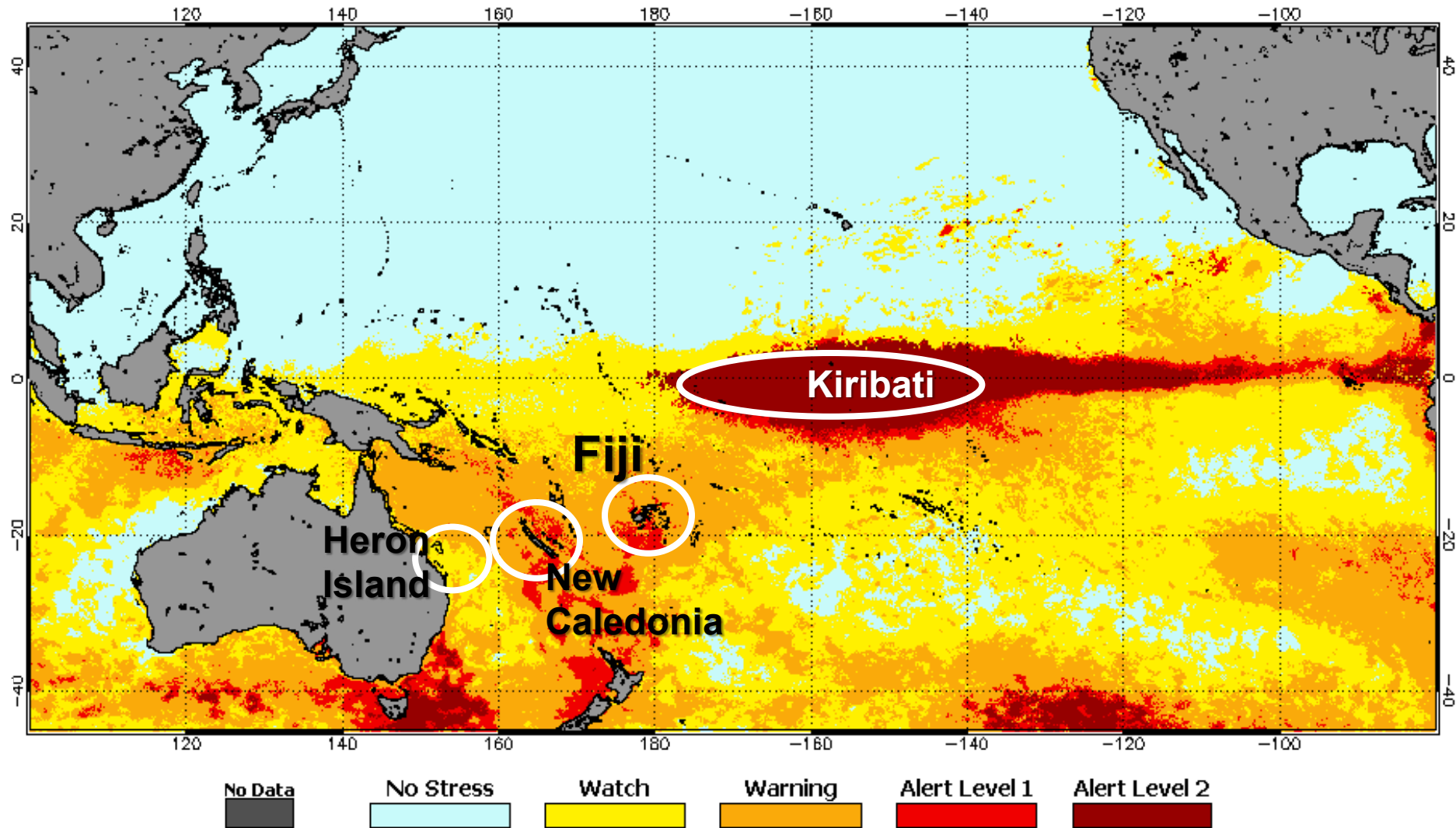
Global Bleaching: Early 2016

NOAA CRW 5-km Night-Only Bleaching Alert Area Year-to-date Maximum 15 Feb 2016



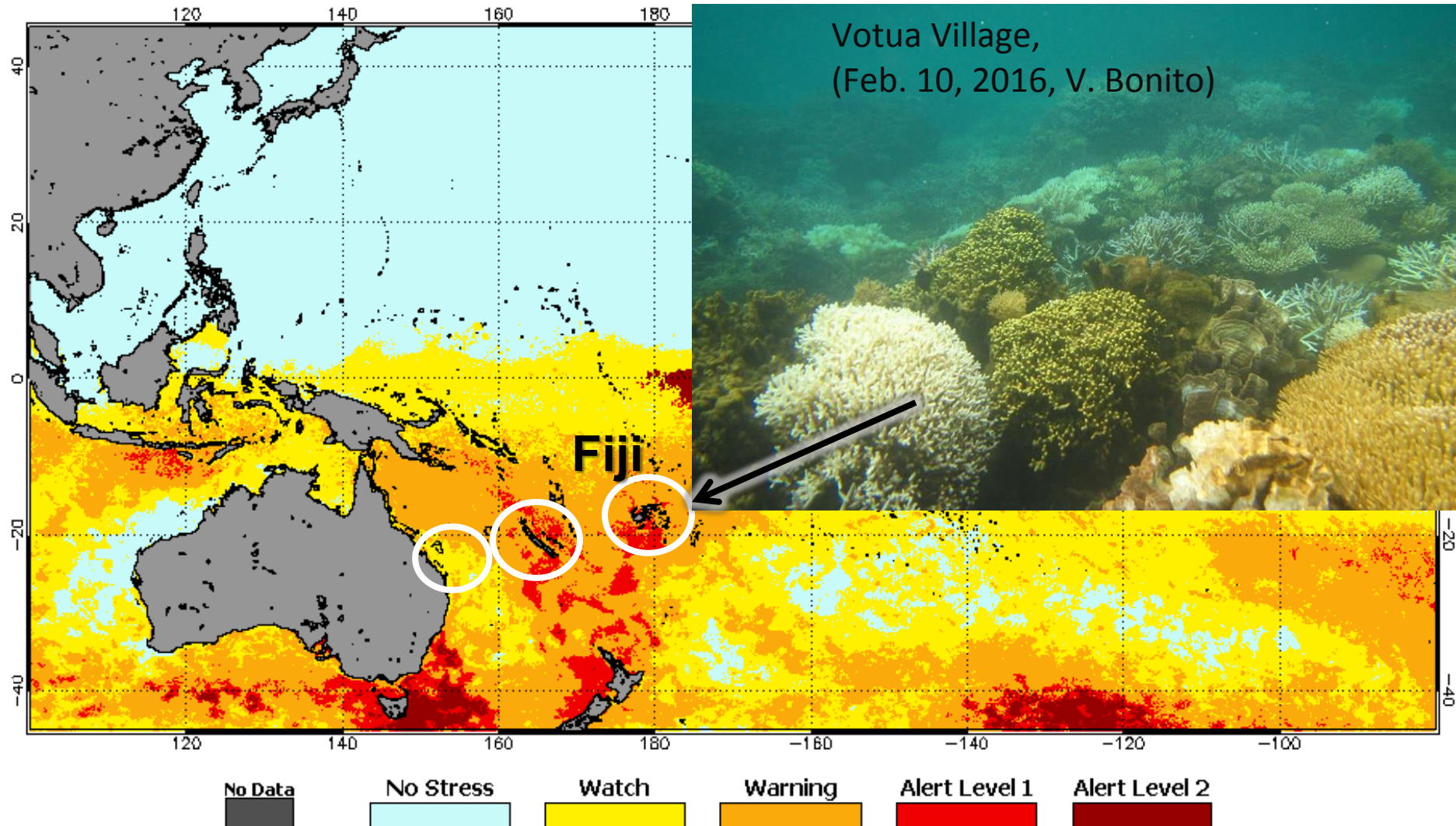
Global Bleaching: Early 2016

NOAA CRW 5-km Night-Only Bleaching Alert Area Year-to-date Maximum 15 Feb 2016



Global Bleaching: Early 2016

NOAA CRW 5-km Night-Only Bleaching Alert Area Year-to-date Maximum 15 Feb 2016



FISHERIES

Fish Kills: Unprecedented temperature threatens marine eco-system

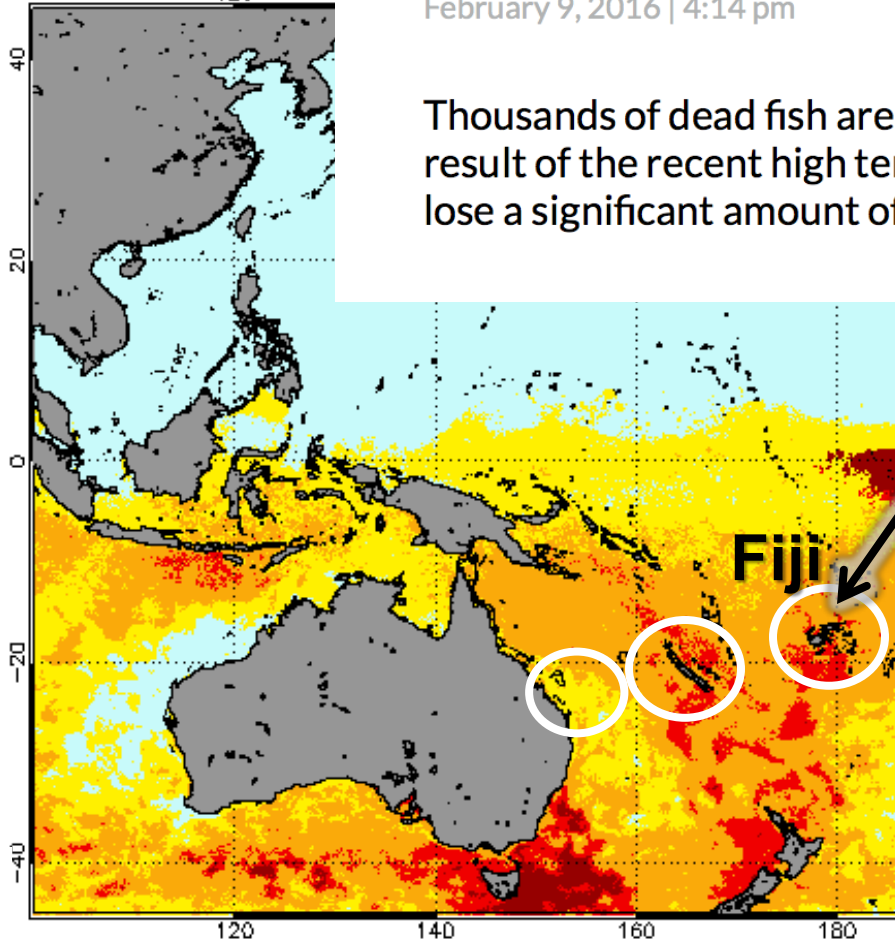
Lice Movono-Rova

February 9, 2016 | 4:14 pm

Thousands of dead fish are washing up on the shores of Coral Coast as a result of the recent high temperature, with a local expert saying reefs could lose a significant amount of coral if seawater temperatures remain high.

NOAA CRW 5-k

120



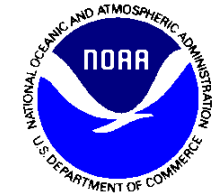
No Data

No Stress

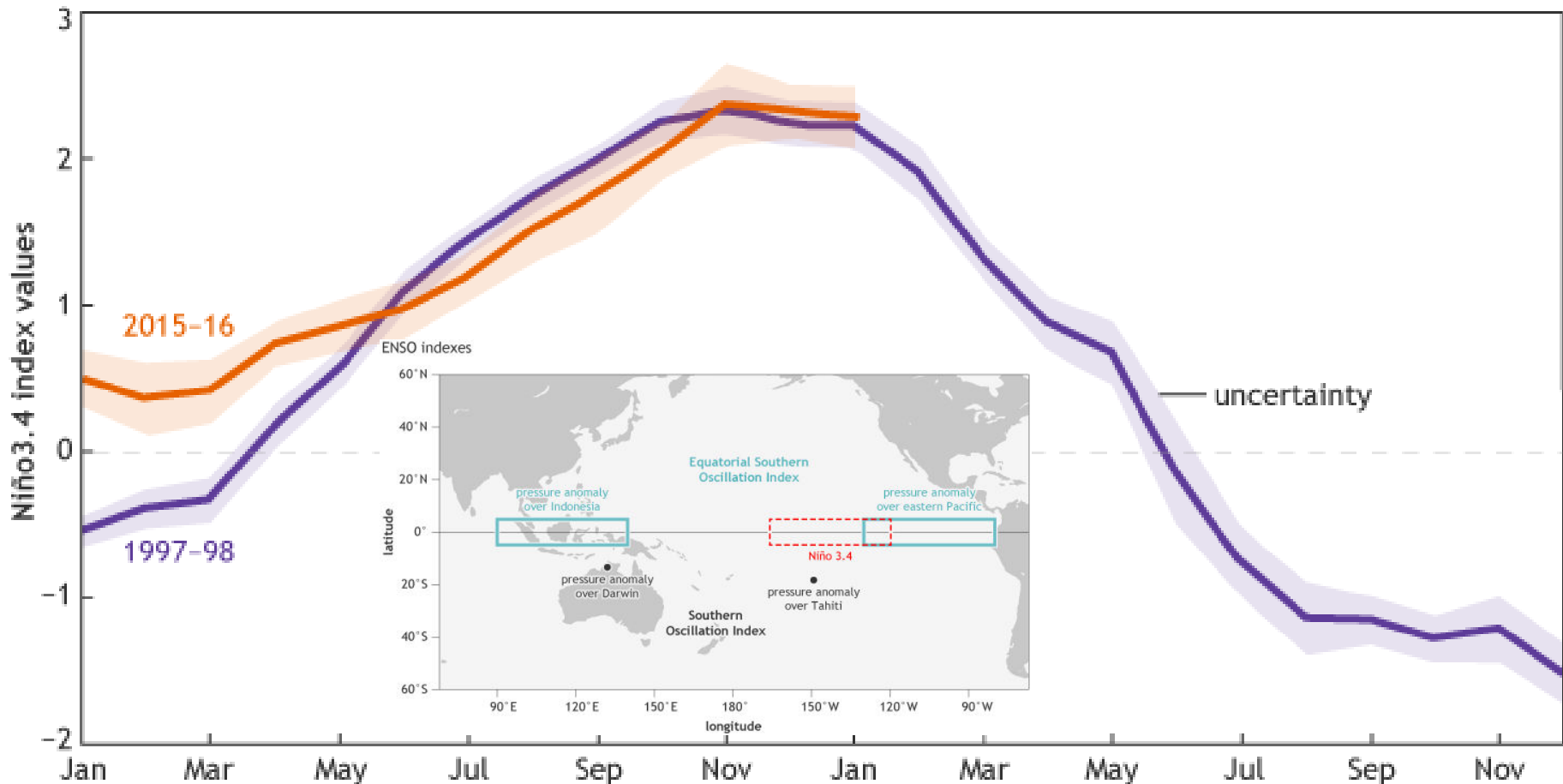
Watch



Who's the Biggest El Niño?



Monthly ERSSTv4 Niño3.4 index values

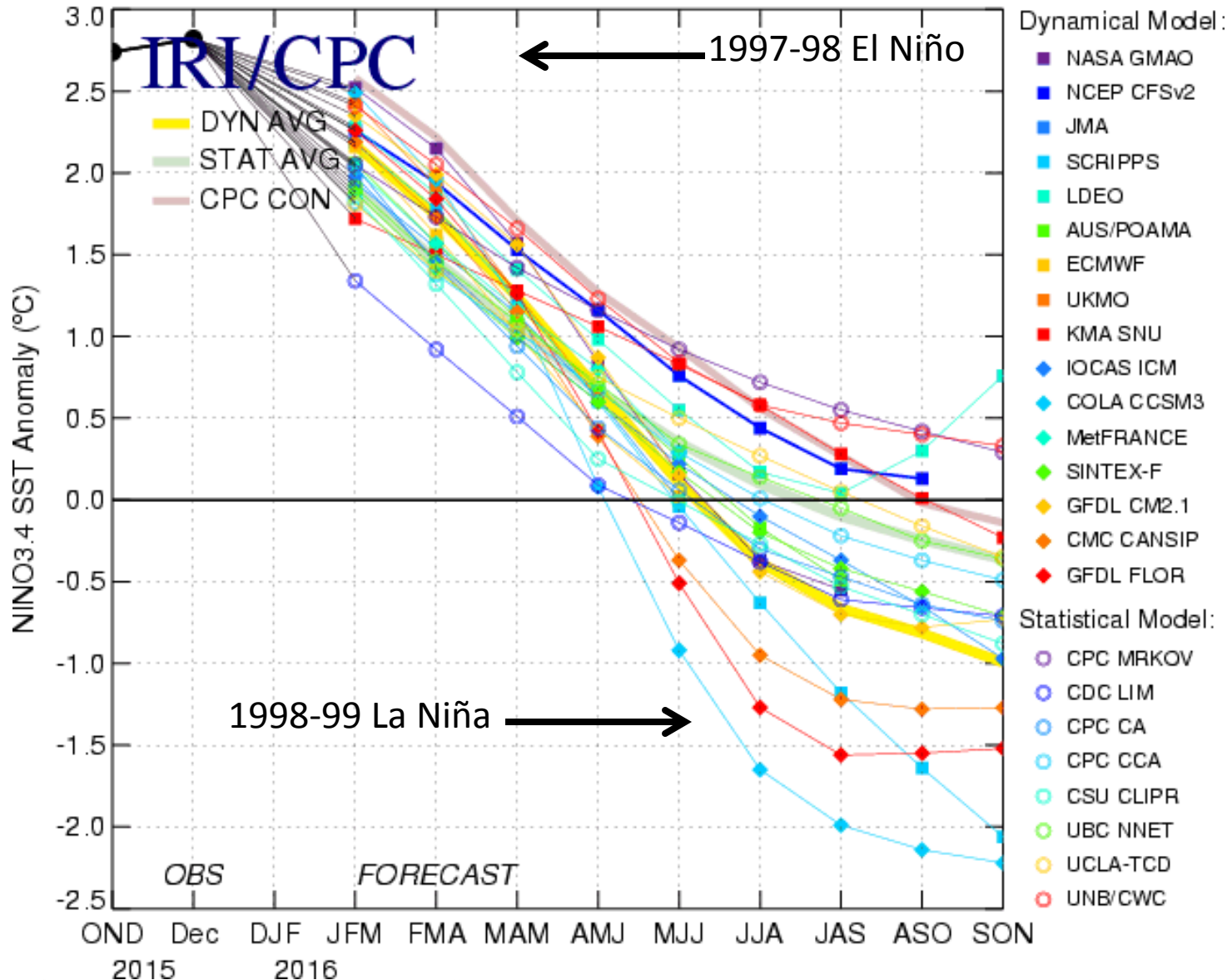


NOAA Climate.gov

El Niño Forecast



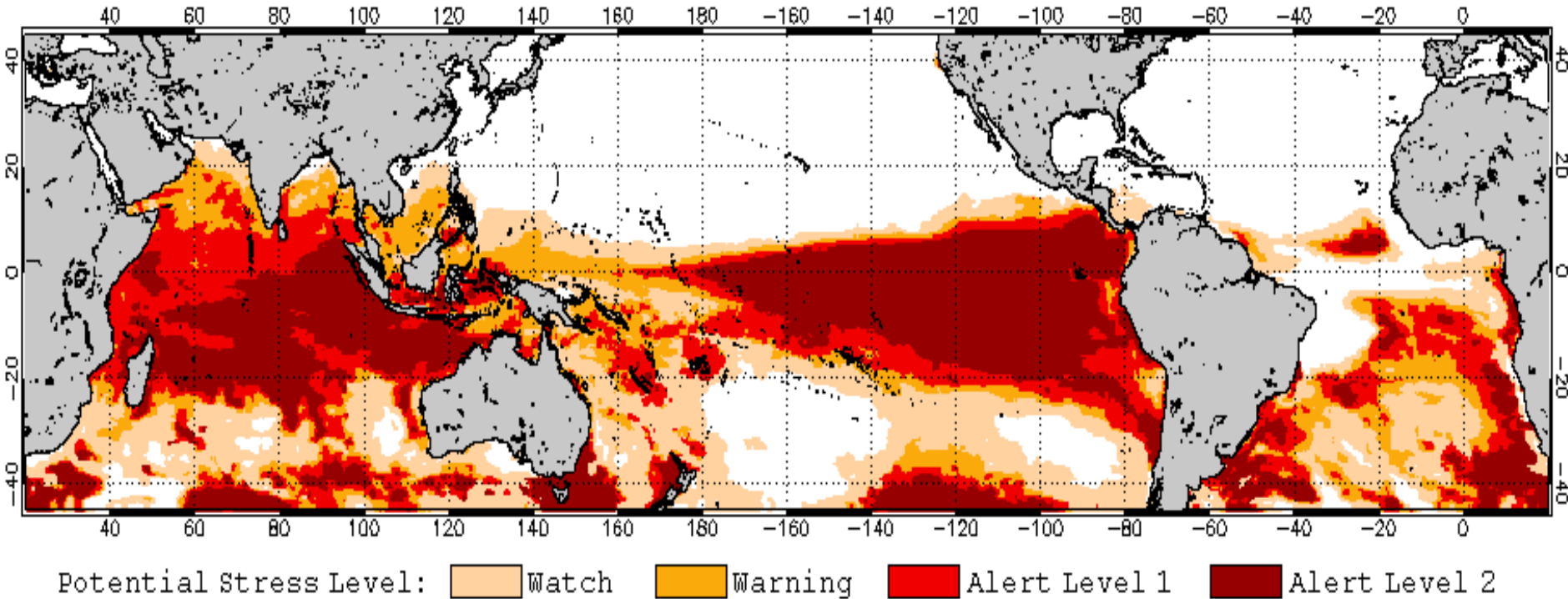
Mid-Jan 2016 Plume of Model ENSO Predictions



Bleaching Risk Through May 2016

Likely to Return to Indian, Eastern Pacific

2016 Feb 16 NOAA Coral Reef Watch 60% Probability Coral Bleaching Thermal Stress for Feb–May 2016
Experimental, v3.0, CFSv2-based, 28-member Ensemble Forecast



June 2014-June 2016 Thermal Stress

Global Reefs:

- 32% → 62% exposed to Alert Level 1 or 2
- ~100% → 100% stressed

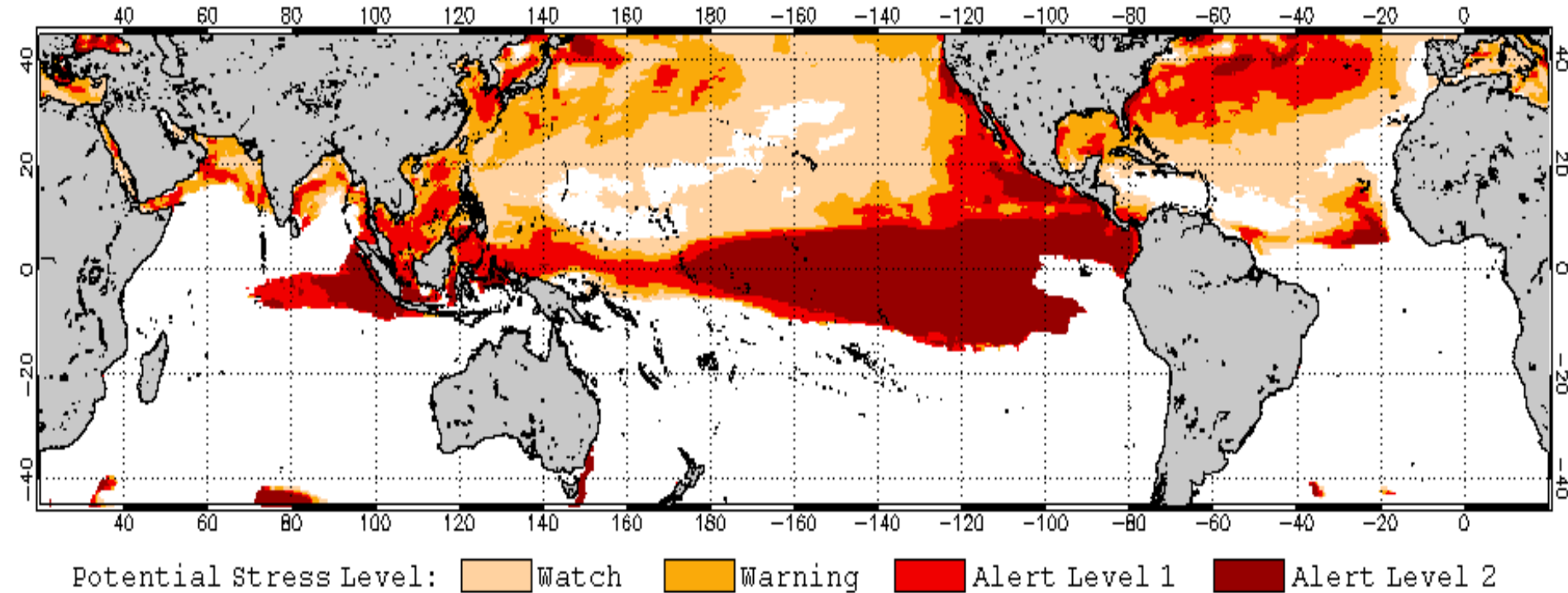
US Reefs:

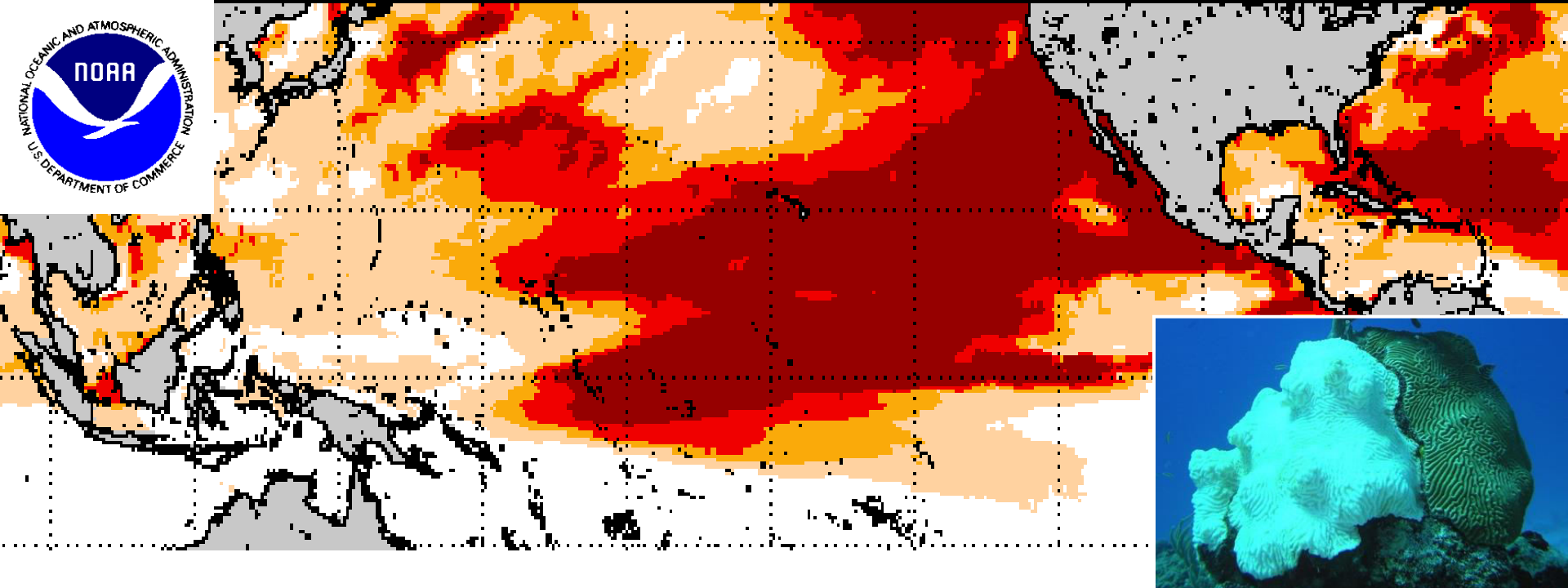
- 72% → 73% exposed to Alert Level 1 or 2
- 100% stressed

Bleaching Risk: June Through August 2016

Likely to Return to Southeast Asia, Caribbean

2016 Feb 16 NOAA Coral Reef Watch 60% Probability Coral Bleaching Thermal Stress for Jun–Aug 2016
Experimental, v3.0, CFSv2-based, 28-member Ensemble Forecast





Questions?

**2016 Outlook on Coral Bleaching: El Niño,
the guest overstaying his welcome**

Dr. C. Mark Eakin

